

# Chapter 1

## INTRODUCTION

### BACKGROUND

This report documents the methods and technical criteria used by staff of the South Florida Water Management District (SFWMD or District) to develop a minimum flow and level (MFL) for the Caloosahatchee River and Estuary.

The District Water Management Plan (DWMP) for South Florida (SFWMD, 2000a) includes a schedule for establishing MFLs for priority water bodies within the District. Section 373.042(2), F.S., requires the water management districts to annually review this list and schedule and make any necessary revisions. This list requires that MFLs for the Caloosahatchee River and Estuary be established by 2000.

These MFLs are being developed pursuant to the requirements contained within the "Florida Water Resources Act", and specifically, Sections 373.042 and 373.0421, F.S., as part of a comprehensive water resources management approach geared towards assuring the sustainability of the water resources. The proposed MFL's are not a "stand alone" resource protection tool; but should be considered in conjunction with all other resource protection responsibility granted to the water management districts by law. This includes consumptive use permitting, water shortage management, and water reservations. A model framework identifying the relationship between these tools is discussed in this document and was used in developing the MFLs. In addition, the District has completed Regional Water Supply Plans pursuant to Chapter 373.0361 F.S., which also include recommendations for establishment of minimum flows and recovery and prevention strategies (SFWMD 2000b, 2000c and 2000d).

Establishing *minimum* levels alone will not be sufficient to maintain a sustainable resource or protect it from significant harm during the broad range of water conditions occurring in the managed system. For the Caloosahatchee River and estuary extended periods of large volume freshwater flows also impact the resource. Setting a minimum flow is viewed as a starting point to define water needs for sustainability. The necessary hydrologic regime for restoration of the Caloosahatchee River and estuary ecosystem must also be defined and implemented through the use of water reservations and other water resource protection tools. Achieving the required water levels throughout this system is an overall, long-term restoration goal (USACE and SFWMD 1999). *Maximum* flows for the Caloosahatchee River and estuary are controlled by regulation schedules for Lake Okeechobee and the structure S-79, but the overall ability of these schedules to protect the resource is uncertain, especially during above normal rainfall years due to the limited water storage capacity of the regional system. As a result, new or revised maximum freshwater flow criteria are being considered as part of the regional water supply plan implementation process. Recently, changes have been made to the maximum water level for Lake Okeechobee, as determined by the regulation schedule (USACE 2000).

As a first formal step to establish a MFL for the Caloosahatchee River and estuary, this report includes the following:

- Description of the framework for determining MFLs based on best available information (this approach may be applied to other surface and ground waters within the District).
- Development of a technical methodology and basis for establishing MFLs for the Caloosahatchee River and Estuary.

This document will receive independent scientific peer review pursuant to Section 373.042, F.S. Initial rule development workshops are currently being held (August 15, 15, 24 and 25, 2000) to discuss concepts proposed for the Caloosahatchee River and Estuary. Persons who wish to receive notice of these workshops, as well as any public meetings conducted during the independent scientific peer review process, should notify the District.

## **PROCESS AND BASES FOR ESTABLISHMENT OF MINIMUM FLOWS AND LEVELS**

### **Process Steps and Activities**

The process for establishing a minimum flow for the Caloosahatchee River and Estuary can be summarized as follows:

1. Through the development of the Lower West Coast Regional Water Supply Plan, the Caloosahatchee River Water Management Plan and the Lower East Coast Regional Water Supply Plan and concurrent staff research and analysis, a methodology and technical basis for establishment of the MFL was developed.
2. Further public consideration of a technical basis and methodology for establishing the MFL and review of the first draft of the rule was conducted during rule development workshops in August 2000.
3. A scientific peer review of the rule and technical documents will be conducted during September 2000 to verify the criteria pursuant to Section 373.0421(2), F.S.
4. In October 2000 revisions to the MFL report recommended by the panel, as appropriate, will be incorporated into the criteria.
5. A final rule draft will be presented to the Governing Board for establishment in December 2000.

### **Legal and Policy Bases for Establishment of Minimum Flows and Levels**

Florida law requires the water management districts to establish MFLs for surface waters and aquifers within their jurisdiction. Section 373.042(1), F.S. The minimum flow is defined as the "...limit at which further withdrawals would be significantly harmful to the water resources or

ecology of the area." The minimum level is defined as the "limit at which further withdrawals would be significantly harmful to the water resources of the area." Section 373.042(1)(a)-(b), F.S. The statute further directs water management districts to use the best available information in establishing a MFL level. Each water management district must also consider, and at its discretion may provide for, the protection of nonconsumptive uses in the establishment of MFLs. (Section 373.042, F.S.) In addition, a baseline condition for the protected resource functions must be identified through consideration of changes and structural alterations in the hydrologic system.

The following sections outline the legal and policy factors relevant to establishing MFLs under the MFL law. In summary, the following questions are answered:

- A. What are the priority functions of each water resource and what is the baseline condition for the functions being protected?
- B. What level of protection for these functions is provided by the MFL standard of protection, significant harm?

### **Identify Relevant Water Resource Functions**

Each surface water body or aquifer serves an array of water resource functions. These functions must be considered when establishing a MFL as a basis for defining significant harm.

The term "water resource" is used throughout Chapter 373. Water resource functions protected under Chapter 373 are broad, as illustrated in Section 373.016, F.S., which includes flood control, water quality protection, water supply and storage, fish and wildlife protection, navigation, and recreation.

The State Water Resource Implementation Rule, Section 62-40.405, F.A.C, outlines specific factors to consider including protection of water resource natural seasonal changes in water flows or levels, environmental values associated with aquatic and wetland ecology, and water levels in aquifer systems. Other specific considerations include:

- Fish and wildlife habitat and the passage of fish
- Maintenance of freshwater storage and supply
- Water quality
- Estuarine resources
- Transfer of detrital material
- Filtration and absorption of nutrients and pollutants
- Sediment loads
- Recreation in and on the water
- Navigation
- Aesthetic and scenic attributes

This policy determination as to which resource functions to consider in establishing MFLs is within the Governing Board's purview. This analysis requires a comprehensive look at sustainability of the resource itself as well as its role in sustaining overall regional water resources. Chapter 4 of the MFL document provides a detailed description of the relevant water resource

functions of the Caloosahatchee River and estuary.

### **Identify Considerations and Exclusions: Baseline Conditions to Protect Water Resource Functions**

Once the water resource functions to be protected by a specific minimum flow or level have been identified, the baseline resource conditions for assessing significant harm must be identified. Considerations for making this determination are set forth in Section 373.0421(1)(a), F.S., which requires the water management districts when setting a MFL, to consider changes and structural alterations that have occurred to a water resource. Likewise, Section 373.0421(1)(b), F.S., recognizes that certain water bodies no longer serve their historical function and that recovery of these water bodies to historical conditions may not be feasible. These provisions are discussed in Chapter 4, to examine their applicability to the minimum levels that are proposed for the Caloosahatchee River and estuary.

### **Level of Protection for Water Resource Functions Provided by the MFL Standard of Significant Harm**

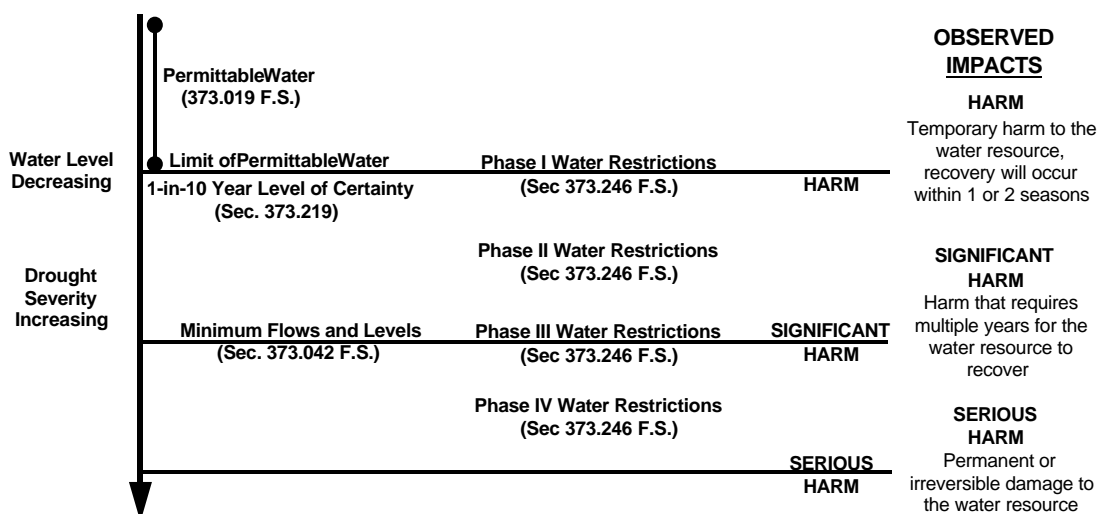
The overall purpose of Chapter 373 is to ensure the sustainability of water resources of the state (Section 373.016, F.S.) To carry out this responsibility, Chapter 373 provides the District with several tools with varying levels of resource protection standards. MFLs play one part in this framework. Determination of the role of MFLs and the protection that they offer, versus other water resource tools available to the District, are discussed below.

The scope and context of MFLs protection rests with the definition of significant harm. The following discussion provides some context to the MFLs statute, including the significant harm standard, in relation to other water resource protection statutes.

Sustainability is the umbrella of water resource protection standards (Section 373.016, F.S.). Each water resource protection standard must fit into a statutory niche to achieve this overall goal. Pursuant to Parts II and IV of Chapter 373, surface water management and consumptive use permitting regulatory programs must prevent **harm** to the water resource. Water shortage statutes dictate that permitted water supplies must be restricted from use to prevent **serious harm** to the water resources. Other resource protection tools include reservation of water for fish and wildlife, or health and safety (Section 373.223(3)), and aquifer zoning to prevent undesirable uses of the ground water (Section 373.036). By contrast, MFLs are set at the point at which **significant harm** to the water resources, or ecology, would occur. The levels of harm cited above, harm, significant harm, and serious harm, are relative resource protection terms, each playing a role in the ultimate goal of achieving a sustainable water resource.

The conceptual relationship among the terms harm, significant harm, and serious harm proposed by the District is shown in **Figure 1**. The general narrative definition of significant harm proposed by the District (SFWMD 2000e) for the water resources of an area is as follows:

***Significant harm** is defined as a loss of specific water resource functions that take multiple years to recover, which result from a change in surface water or ground water hydrology.*



**Figure 1. Conceptual Relationships among the Terms Harm, Significant Harm and Serious Harm**

## Other Levels of Harm Considered in Florida Statutes

A discussion of the other levels of harm identified in the conceptual model for consumptive use permitting and water shortage is provided below to give context to the proposed significant harm standard.

### Consumptive Use Permitting Role - Harm Standard

The resource protection criteria used for Consumptive Use Permitting (CUP) are based on the level of impact that is considered harmful to the water resource. These criteria are applied, to various resource functions, to establish the range of hydrologic change that can occur without harm. The hydrological criteria include level, duration, and frequency components and are used to define the amount of water that can be allocated from the resource. Saltwater intrusion, wetland drawdown, aquifer mining, and pollution prevention criteria in Chapter 40E-2, F.A.C., all together define the harm standard for purposes of consumptive use allocation. These harm criteria may be applied using climate conditions that represent an assumed level of certainty. The level of certainty used in the Lower West Coast, Lower East Coast, and Upper East Coast Regional Water Supply Plans (SFWMD 2000b, 2000c and 2000d) is a 1-in-10 year drought frequency, as defined in the District's permitting rules. The 1-in-10 year drought level of certainty is also the water supply planning goal that was established in Section 373.0361, F.S. The standard for harm used in the CUP process is considered as the point at which adverse impacts to water resources cannot be restored within a period of one to two years of average rainfall conditions. These short-term adverse impacts are addressed for the CUP program, which calculates allocations to meet demands for use during relatively mild, dry season events, defined as the 1-in-10 year drought.

### Water Shortage Role - Serious Harm Standard

Pursuant to Section 373.246, F.S., water shortage declarations are designed to prevent serious harm from occurring to water resources. Serious harm, the ultimate harm to the water

resources that was contemplated under Chapter 373, F.S., can be interpreted as long-term, irreversible, or permanent impacts. Declaration of water shortages is the tool used by the Governing Board to prevent serious harm.

When drought conditions exist, water users, typically for irrigation or outside use, increase withdrawals to supplement water not provided by rainfall. In general, the more severe the drought, the more supplemental water is needed, which increases water shortage restrictions for users. These increased withdrawals increase the potential for serious harm to the water resource.

The District has implemented its water shortage authority by restricting consumptive uses based on the concept of shared adversity between users and the water resources (Chapter 40E-21, F.A.C.). Under this program, different levels or phases of water shortage restrictions are imposed relative to the severity of drought conditions. The four phases of the current water shortage restrictions are based on relative levels of risk posed to resource conditions leading up to serious harm impacts. Under the SFWMD's program, Phase I and II water shortages are primarily designed to prevent harm, such as localized, but recoverable, damage to wetlands or short-term inability to maintain water levels needed for restoration. Actions that may be taken include reducing water use through conservation techniques and minor use restrictions, such as car washing and lawn watering. Phases III and IV, however, require use cutbacks that are associated with some level of economic impact to the users, such as agricultural irrigation restriction.

## **MFL RECOVERY AND PREVENTION STRATEGY**

Upon establishment of the MFL through rulemaking, it is implemented through a multifaceted recovery and prevention strategy, developed pursuant to Section 373.0421(2), F.S. A recovery and prevention strategy was developed for the Caloosahatchee in the Lower East Coast Regional Water Supply Plan (approved May 2000) and the Caloosahatchee Water Management District (approved April 2000), and will be implemented following establishment of the MFL.

Section 373.0421(2), F.S., provides that if it is determined that water flows or levels will fall below an established MFL within the next 20 years or is presently below the MFL, the water management district must develop and implement a recovery or prevention strategy. The twenty year period should coincide with the regional water supply plan horizon for the subject area and the strategy is to be developed in concert with that planning process.

The goal of the recovery and prevention strategy is to continue to provide sufficient water supplies for all existing and projected reasonable-beneficial demands, while taking actions to achieve the MFL criteria. If the existing level is below the MFL, recovery to the MFL must be achieved "as soon as practicable." Many different factors will influence the water management district's capability to implement the proposed actions in a timely manner, including funding availability, detail design development, permissibility of regulated actions, land acquisition, and implementation of updated permitting rules.

Depending on the existing and projected flows or levels, from a regulatory standpoint, either water shortage triggers, interim consumptive use permit criteria, or both, may be recommended in the recovery and prevention strategy. The approach varies depending on whether the MFL is currently exceeded or not, and depending on the cause of the MFL

exceedances, e.g., consumptive use withdrawals, poor surface water conveyance facilities or operations, over drainage, or a combination of the above.

Incremental measures to achieve the MFL must be included in the recovery and prevention strategy, include a timetable for a provision of water supplies necessary to meet reasonable beneficial uses. Such measures include development of additional water supplies and conservation and other efficiency measures. These measures must make water available "concurrent with to the extent practical, and to offset, reductions in permitted withdrawals, consistent with ...[Chapter 373]." The determination of what is "practical" in identifying measures to concurrently replace water supplies will likely be made through consideration of economic and technical feasibility of potential options. Additional information about the specific recovery and prevention strategy recommended for the Caloosahatchee River and Estuary is provided in Chapter 4.

## **DOCUMENT STRUCTURE**

The following chapter of this report describes the geographic setting, the resources at risk, and major issues concerning the use and conservation of resources within the Caloosahatchee River and Estuary. Chapter 3 documents the methods that were used to establish significant harm criteria for the different areas, resources and functions. Chapter 4 describes the specific hydrologic criteria, with frequency, duration, and depth components, that were developed to indicate the point at which significant harm occurs and includes an analysis of the specific relevant factors and implications of the proposed definition of significant harm. Conclusions and recommendations are presented in Chapter 5 and the literature cited is in the final chapter. Technical Appendices A through F are provided in a separate volume and include more detailed descriptions and analysis of available data, literature, and issues raised during the review process.